

Claims

[c1] What is claimed is:

1.A light collimating and diffusing film, comprising:
a plastic layer having a first side and a second side opposite the first side and at least a first peripheral edge, the first side having a first textured surface, wherein between 7 to 20 percent of slope angles on the first textured surface proximate a first axis have a value between zero and five degrees, the first axis being substantially parallel to the first peripheral edge, wherein the plastic layer collimates light propagating therethrough.

[c2] 2.The light collimating and diffusing film of claim 1, wherein between 7 to 20 percent of slope angles on the first textured surface proximate a second axis have a value between zero and five degrees, the second axis being substantially perpendicular to the first axis.

[c3] 3.The light collimating and diffusing film of claim 1, wherein the first textured surface comprises a plurality of projecting portions and a plurality of trough portions, wherein each projecting portion extends outwardly from at least one adjacent trough portion.

- [c4] 4.The light collimating and diffusing film of claim 3, wherein an average height of the plurality of projecting portions is within a range of 25–75 percent of an average width of the plurality of projecting portions.
- [c5] 5.The light collimating and diffusing film of claim 3, wherein an average width of the plurality of projecting portions is within a range of 0.5–100 microns.
- [c6] 6.The light collimating and diffusing film of claim 1, wherein the plastic layer collimates light propagating through the plastic layer from the second side to the first side.
- [c7] 7.The light collimating and diffusing film of claim 6, wherein the plastic layer collimates light passing therethrough toward an axis perpendicular to the plastic layer.
- [c8] 8.The light collimating and diffusing film of claim 1, wherein the second side comprises a second textured surface, wherein greater than or equal to 70 percent of slope angles on the second textured surface have a value between zero and five degrees.
- [c9] 9.The light collimating and diffusing film of claim 1, wherein the plastic layer contains an optical brightener in a range of 0.001–1.0 percent of a total mass of the

layer.

- [c10] 10. The light collimating and diffusing film of claim 1, wherein the plastic layer contains an antistatic compound therein.
- [c11] 11. The light collimating and diffusing film of claim 10, wherein the antistatic compound comprises a fluorinated phosphonium sulfonate.
- [c12] 12. The light collimating and diffusing film of claim 1, wherein the plastic layer contains a UV absorber compound in a range of 0.01–1.0 percent of a total mass of the plastic layer.
- [c13] 13. The light collimating and diffusing film of claim 1, wherein the plastic layer has a thickness in a range of 0.025–10 millimeters.
- [c14] 14. The light collimating and diffusing film of claim 1, wherein the plastic layer has a thickness in a range of 0.025–0.5 millimeters.
- [c15] 15. The light collimating and diffusing film of claim 1, wherein between 7 to 20 percent of slope angles on the first textured surface are between zero and five degrees.
- [c16] 16. A method for manufacturing a light collimating and diffusing film, comprising:

extruding heated plastic through a die to form a plastic layer, the plastic layer having a first side and a second side opposite the first side and at least a first peripheral edge, the plastic layer extending along both a first axis and a second axis, the first axis being substantially parallel to the first peripheral edge, the second axis being substantially perpendicular to the first axis;
cooling at least one of first and second rotating cylindrical rollers below a predetermined temperature; and
moving the plastic layer between first and second rotating cylindrical rollers, the first cylindrical roller contacting the first side of the plastic layer and the second cylindrical roller contacting the second side, the first cylindrical roller forming a first textured surface on the first side of the plastic layer, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the first axis have a value between zero and five degrees.

[c17] 17.The method of claim 16, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the second axis have a value between zero and five degrees.

[c18] 18.The method of claim 16, further comprising winding the cooled plastic layer around a receiving spool.

[c19] 19.The method of claim 16, wherein between 7 to 20 percent of slope angles on the first textured surface have a value between zero and five degrees.

[c20] 20.A system for manufacturing a light collimating and diffusing film, comprising:
an extruder device operably coupled to a die, the extruder device urging heated plastic through the die to form a plastic layer, the plastic layer having a first side and a second side opposite the first side and at least a first peripheral edge, the plastic layer extending along both a first axis and a second axis, the first axis being substantially parallel to the first peripheral edge, the second axis being substantially perpendicular to the first axis;
first and second cylindrical rollers disposed proximate one another for receiving the plastic layer; and
a cooling device configured to cool at least one of the first and second cylindrical rollers below a predetermined temperature, wherein the first cylindrical roller contacts the first side of the plastic layer and forms a first textured surface on the first side of the plastic layer, the second cylindrical roller contacts the second side of the plastic layer, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the first axis have a value between zero and five degrees.

- [c21] 21.The system of claim 20, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the second axis have a value between zero and five degrees.
- [c22] 22.The system of claim 20, wherein the second cylindrical roller forms a second textured surface on the plastic layer, wherein greater than or equal to 70 percent of slope angles on the second textured surface have a value between zero and five degrees.
- [c23] 23.The system of claim 20, further comprising:
third and fourth cylindrical rollers disposed proximate one another for receiving the cooled plastic layer from the first and second rollers, the third and fourth cylindrical rollers both being configured to rotate to urge the plastic layer toward a winder device, the winder device receiving the plastic layer and winding the plastic layer around a receiving spool.
- [c24] 24.The system of claim 20, wherein between 7 to 20 percent of slope angles on the first textured surface have a value between zero and five degrees.
- [c25] 25.A method for manufacturing a light collimating and diffusing film, comprising:
heating a plastic layer having a first side and a second

side, the plastic layer having a first side and a second side opposite the first side and at least a first peripheral edge, the plastic layer extending along both a first axis and a second axis, the first axis being substantially parallel to the first peripheral edge, the second axis being substantially perpendicular to the first axis;

heating at least one of the first and second cylindrical rollers above a predetermined temperature; and

moving the plastic layer between first and second rotating cylindrical rollers wherein the first cylindrical roller contacts the first side of the plastic layer and the second cylindrical roller contacts the second side, the first cylindrical roller forming a first textured surface on the first side proximate the first axis of the plastic layer, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the first axis have a value between zero and five degrees.

[c26] 26.The method of claim 25, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the second axis have a value between zero and five degrees.

[c27] 27.The method of claim 25, further comprising winding the plastic layer around a receiving spool.

[c28] 28.The method of claim 25, wherein between 7 to 20

percent of slope angles on the first textured surface have a value between zero and five degrees.

[c29] 29. A system for manufacturing a light collimating and diffusing film, comprising:
a first heating device configured to heat a plastic layer, the plastic layer having a first side and a second side opposite the first side and at least a first peripheral edge, the plastic layer extending along both a first axis and a second axis, the first axis being substantially parallel to the first peripheral edge, the second axis being substantially perpendicular to the first axis;
first and second cylindrical rollers being disposed proximate one another for receiving the plastic layer; and
a second heating device configured to heat at least one of first and second cylindrical rollers, wherein the first cylindrical roller contacts the first side of the plastic layer and forms a first textured surface on the first side and the second cylindrical roller contacts the second side of the plastic layer, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the first axis have a value between zero and five degrees.

[c30] 30. The system of claim 29, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the second axis have a value between zero and five degrees.

[c31] 31. The system of claim 29, wherein the second cylindrical roller forms a second textured surface on the second side, wherein greater than or equal to 70 percent of slope angles on the second textured surface have a value between zero and five degrees.

[c32] 32. The system of claim 29, further comprising:
third and fourth cylindrical rollers disposed proximate one another for receiving the cooled plastic layer from the first and second cylindrical rollers, the third and fourth cylindrical rollers both being configured to rotate to urge the plastic layer toward a winder device, the winder device receiving the plastic layer and winding the plastic layer around a receiving spool.

[c33] 33. The system of claim 29, wherein between 7 to 20 percent of slope angles on the first textured surface have a value between zero and five degrees.

[c34] 34. A tool for forming a textured surface on a light collimating and diffusing film, comprising:
a cylindrical portion being disposed about a first axis and having an external textured surface and first and second ends, the cylindrical portion further having a first line disposed proximate the external textured surface extending substantially across the cylindrical portion

substantially perpendicular to the first end, the cylindrical portion further having a second line extending around a periphery of the cylindrical portion substantially a predetermined distance from the first end, the external textured surface having a plurality of projecting portions and a plurality of trough portions, wherein each projecting portion extends outwardly from at least one adjacent trough portion, wherein the plurality of projecting portions and the plurality of trough portions define a plurality of slope angles, wherein between 7 to 20 percent of the slope angles on the external textured surface proximate the first line or the second line have a value between zero and five degrees.

[c35] 35.The tool of claim 34, wherein between 7 to 20 percent of the slope angles on the external textured surface proximate both the first line and the second line have a value between zero and five degrees.

[c36] 36.The tool of claim 34, wherein between 7 to 20 percent of the slope angles on the external textured surface have a value between zero and five degrees.

[c37] 37.A method for forming a textured surface on a cylindrical roller, the cylindrical roller being disposed about a first axis and having an external textured surface and first and second ends, the cylindrical roller further hav-

ing a first line disposed proximate the external textured surface extending substantially across the cylindrical roller substantially perpendicular to the first end, the cylindrical roller further having a second line extending around a periphery of the cylindrical portion substantially a predetermined distance from the first end, comprising:

rotating the cylindrical roller at a predetermined rotational speed about the first axis; and

emitting a pulsating energy beam that contacts the outer surface of the cylindrical roller at a predetermined intensity and moving the energy beam from the first end to the second end of the cylindrical roller during the rotation of the cylindrical roller, wherein the energy beam removes portions of the outer surface to obtain the textured surface, wherein between 7 to 20 percent of slope angles on the textured surface proximate the first line or the second line have a value between zero and five degrees.

[c38] 38. The method of claim 37, wherein between 7 to 20 percent of the slope angles on the textured surface proximate both the first line and the second line have a value between zero and five degrees.

[c39] 39. The method of claim 37, wherein between 7 to 20 percent of the slope angles on the textured surface have

a value between zero and five degrees.

- [c40] 40. The method of claim 37, wherein a linear speed of an outer surface of the cylindrical roller is within a range of 25–2500 millimeters per second.
- [c41] 41. The method of claim 37, wherein the energy beam is moved relative to the cylindrical roller at a speed within a range of 0.001–0.1 millimeters per second.
- [c42] 42. The method of claim 37, wherein the energy beam has a focal diameter at the outer surface of the cylindrical roller in a range of 0.005–0.05 millimeters.
- [c43] 43. The method of claim 42, wherein the energy beam contacting the cylindrical roller has an energy level in a range of 0.05–1.0 Joules delivered over a time period in a range of 0.1–100 microseconds for a predetermined area of the cylindrical roller.
- [c44] 44. The method of claim 37, wherein the energy beam comprises a laser beam.
- [c45] 45. The method of claim 44, wherein the laser beam has a wavelength of 1.06 microns.
- [c46] 46. The method of claim 44, wherein the laser beam comprises a Nd:YAG laser beam.

- [c47] 47.The method of claim 37, wherein the energy beam comprises an electron beam.
- [c48] 48.The method of claim 37, wherein the beam comprises an ion beam.
- [c49] 49.The method of claim 37, wherein the textured surface comprises a plurality of projecting portions and a plurality of trough portions, wherein each projecting portion extends outwardly from at least one adjacent trough portion.
- [c50] 50.The method of claim 49, wherein an average height of the plurality of projecting portions is within a range of 25–100 percent of an average width of the plurality of projecting portions.
- [c51] 51.The method of claim 49, wherein an average width of the plurality of projecting portions is within a range of 0.5–100 microns.
- [c52] 52.A method for forming a textured surface on a cylindrical roller, the cylindrical roller being disposed about a first axis and having an external textured surface and first and second ends, the cylindrical roller further having a first line disposed proximate the external textured surface, the first line extending substantially across the cylindrical roller substantially perpendicular to the first

end, the cylindrical roller further having a second line extending around a periphery of the cylindrical portion substantially a predetermined distance from the first end, comprising:

rotating the cylindrical roller at a predetermined rotational speed about the first axis in an electrolyte fluid, the cylindrical roller being electrically grounded; and applying a predetermined current density to the electrolyte fluid wherein metal ions in the fluid bond to the outer surface of the cylindrical roller to form the textured surface, wherein between 7 to 20 percent of slope angles on the textured surface proximate the first line or the second line have a value between zero and five degrees.

[c53] 53.The method of claim 52, wherein between 7 to 20 percent of the slope angles on the textured surface proximate both the first line and the second line have a value between zero and five degrees.

[c54] 54.The method of claim 52, wherein between 7 to 20 percent of the slope angles on the textured surface have a value between zero and five degrees.

[c55] 55.The method of claim 52, wherein the cylindrical roller rotates in the electrolyte fluid at a rotational speed in a range of 1–10 revolutions per minute for a time period

in a range of 0.5–50 hours.

[c56] 56.The method of claim 52, wherein the metal ions comprises chromium ions.

[c57] 57.The method of claim 52, wherein the predetermined current density is in a range of 0.001–0.01 amperes per square millimeter.

[c58] 58.The method of claim 52, wherein the textured surface comprises a plurality of projecting portions and a plurality of trough portions, wherein each projecting portion extends outwardly from at least one adjacent trough portion.

[c59] 59.The method of claim 58, wherein an average height of the plurality of projecting portions is within a range of 25–100 percent of an average width of the plurality of projecting portions.

[c60] 60.The method of claim 58, wherein an average width of the plurality of projecting portions is within a range of 0.5–100 microns.

[c61] 61.A method for forming a textured surface on a cylindrical roller, the cylindrical roller being disposed about a first axis and having an external textured surface and first and second ends, the cylindrical roller further hav-

ing a first line disposed proximate the external textured surface, the first line extending substantially across the cylindrical roller substantially perpendicular to the first end, the cylindrical roller further having a second line extending around a periphery of the cylindrical portion substantially a predetermined distance from the first end, comprising:

rotating the cylindrical roller at a predetermined rotational speed about the first axis in a fluid containing metal ions and non-metal particles; and chemically bonding the metal ions and the non-metal particles to the outer surface of the cylindrical roller to form the textured surface, wherein between 7 to 20 percent of slope angles on the textured surface proximate the first line or the second line have a value between zero and five degrees.

[c62] 62.The method of claim 61, wherein between 7 to 20 percent of the slope angles on the textured surface proximate both the first line and the second line have a value between zero and five degrees.

[c63] 63.The method of claim 61, wherein between 7 to 20 percent of the slope angles on the textured surface have a value between zero and five degrees.

[c64] 64.The method of claim 61, wherein the non-metal par-

ticles comprise silica particles having a size in a range of 1–100 micrometers.

[c65] 65.The method of claim 64, wherein the silica particles comprise solid silica particles.

[c66] 66.The method of claim 64, wherein the silica particles comprise hollow silica particles.

[c67] 67.The method of claim 64, wherein the silica particles comprise porous silica particles.

[c68] 68.The method of claim 61, wherein the non-metal particles comprise alumina particles having a size in a range of 1–100 micrometers.

[c69] 69.The method of claim 68, wherein the alumina particles comprise solid alumina particles.

[c70] 70.The method of claim 68, wherein the alumina particles comprise porous alumina particles.

[c71] 71.The method of claim 61, wherein the metal ions comprise one of nickel ions and nickel alloy ions.

[c72] 72.The method of claim 61, wherein the textured surface comprises a plurality of projecting portions and a plurality of trough portions, wherein each projecting portion extends outwardly from at least one adjacent trough

portion.

- [c73] 73.The method of claim 72, wherein an average height of the plurality of projecting portions is within a range of 25–100 percent of an average width of the plurality of projecting portions.
- [c74] 74.The method of claim 72, wherein an average width of the plurality of projecting portions is within a range of 0.5–100 microns.
- [c75] 75.The method of claim 61, wherein the non-metal particles comprise diamond particles having a size in a range of 1–100 micrometers.
- [c76] 76.A method for forming a textured surface on a cylindrical roller, the cylindrical roller being disposed about a first axis and having an external textured surface and first and second ends, the cylindrical roller further having a first line disposed proximate the external textured surface, the first line extending substantially across the cylindrical roller substantially perpendicular to the first end, the cylindrical roller further having a second line extending around a periphery of the cylindrical portion substantially a predetermined distance from the first end, comprising:
rotating the cylindrical roller at a predetermined rota–

tional speed about the first axis;
applying a dielectric fluid on the cylindrical roller; and
iteratively discharging an electric spark from one or
more electrodes disposed proximate the cylindrical
roller, the electric spark contacting the outer surface of
the cylindrical roller that heats and melts a predeter-
mined amount of metal on the cylindrical roller to form
the textured surface, the electric spark being moved
from the first end to the second end of the cylindrical
roller during the rotation of the cylindrical roller, wherein
between 7 to 20 percent of slope angles on the textured
surface proximate the first line or the second line have a
value between zero and five degrees.

[c77] 77. The method of claim 76, wherein between 7 to 20
percent of the slope angles on the textured surface
proximate both the first line and the second line have a
value between zero and five degrees.

[c78] 78. The method of claim 76, wherein between 7 to 20
percent of the slope angles on the textured surface have
a value between zero and five degrees.

[c79] 79. The method of claim 76, wherein the electric spark
has a voltage of 100–1000 volts.

[c80] 80. The method of claim 76, wherein the textured surface

comprises a plurality of projecting portions and a plurality of trough portions, wherein each projecting portion extends outwardly from at least one adjacent trough portion.

[c81] 81.The method of claim 80, wherein an average height of the plurality of projecting portions is within a range of 25–100 percent of an average width of the plurality of projecting portions.

[c82] 82.The method of claim 80, wherein an average width of the plurality of projecting portions is within a range of 0.5–100 microns.

[c83] 83.A method for forming a textured surface on a cylindrical roller, the cylindrical roller being disposed about a first axis and having an external textured surface and first and second ends, the cylindrical roller further having a first line disposed proximate the external textured surface, the first line extending substantially across the cylindrical roller substantially perpendicular to the first end, the cylindrical roller further having a second line extending around a periphery of the cylindrical portion substantially a predetermined distance from the first end, comprising:
rotating the cylindrical roller at a predetermined rotational speed about the first axis; and

iteratively contacting the outer surface of the cylindrical roller using a cutting tool at a predetermined frequency, the cutting tool moving from the first end to the second end of the cylindrical roller during the rotation of the cylindrical roller, wherein the cutting tool removes portions of the outer surface to obtain the textured surface, wherein between 7 to 20 percent of slope angles on the textured surface proximate the first line or the second line have a value between zero and five degrees.

[c84] 84.The method of claim 83, wherein between 7 to 20 percent of the slope angles on the textured surface proximate both the first line and the second line have a value between zero and five degrees.

[c85] 85.The method of claim 83, wherein between 7 to 20 percent of the slope angles on the textured surface have a value between zero and five degrees.

[c86] 86.The method of claim 83, wherein the predetermined rotational speed of the cylindrical roller is within a range of 10–200 revolutions per minute.

[c87] 87.The method of claim 83, wherein the predetermined frequency is within a range of 1000–1500 kilohertz.

[c88] 88.The method of claim 83, wherein the textured surface comprises a plurality of projecting portions and a plural–

ity of trough portions, wherein each projecting portion extends outwardly from at least one adjacent trough portion.

[c89] 89.The method of claim 88, wherein an average height of the plurality of projecting portions is within a range of 25–100 percent of an average width of the plurality of projecting portions.

[c90] 90.The method of claim 88, wherein an average width of the plurality of projecting portions is within a range of 0.5–100 microns.

[c91] 91.A method for forming a textured surface on a cylindrical roller, the cylindrical roller being disposed about a first axis and having an external textured surface and first and second ends, the cylindrical roller further having a first line disposed proximate the external textured surface, the first line extending substantially across the cylindrical roller substantially perpendicular to the first end, the cylindrical roller further having a second line extending around a periphery of the cylindrical portion substantially a predetermined distance from the first end, comprising:
coating the cylindrical roller with a chemically resistant layer, wherein the chemically resistant layer is removed at predetermined locations to expose the underlying

cylindrical roller surface at the predetermined locations;
and
rotating the cylindrical roller at a predetermined rotational speed about the first axis in a container containing an etching solution, wherein the etching solution removes portions of the cylindrical roller at the predetermined locations to obtain the textured surface, wherein between 7 to 20 percent of slope angles on the textured surface proximate the first line or the second line have a value between zero and five degrees.

[c92] 92.The method of claim 91, wherein between 7 to 20 percent of the slope angles on the textured surface proximate both the first line and the second line have a value between zero and five degrees.

[c93] 93.The method of claim 91, wherein between 7 to 20 percent of the slope angles on the textured surface have a value between zero and five degrees.

[c94] 94.The method of claim 91, wherein the cylindrical roller is rotated at a rotational speed in a range of 1–50 revolutions per minute.

[c95] 95.The method of claim 91, wherein 5 to 25 percent of a mass of the etching solution is nitric acid.

[c96] 96.The method of claim 91, wherein 5 to 25 percent of a

mass of the etching solution is a hydrochloric acid.

- [c97] 97.The method of claim 91, wherein the chemically resistant layer is removed at the predetermined locations using a lithographic process.
- [c98] 98.The method of claim 91, wherein the chemically resistant layer is removed at the predetermined locations using an energy beam.
- [c99] 99.The method of claim 91, wherein the chemically resistant layer is removed at the predetermined locations by contacting the cylindrical roller with a tool, the tool having a hardness greater than the chemically resistant layer but less than a hardness of the cylindrical roller.
- [c100] 100.The method of claim 91, wherein the chemically resistant layer comprises a photo-resist layer.
- [c101] 101.The method of claim 91, wherein the chemically resistant layer comprises a wax layer.
- [c102] 102.The method of claim 91, wherein the chemically resistant layer comprises a plastic layer.
- [c103] 103.The method of claim 91, wherein the textured surface comprises a plurality of projecting portions and a plurality of trough portions, wherein each projecting portion extends outwardly from at least one adjacent

trough portion.

[c104] 104.The method of claim 103, wherein an average height of the plurality of projecting portions is within a range of 25–100 percent of an average width of the plurality of projecting portions.

[c105] 105.The method of claim 103, wherein an average width of the plurality of projecting portions is within a range of 0.5–100 microns.

[c106] 106.A back lighted device, comprising:
a light source;
a light guide disposed proximate the light source for receiving light from the light source; and
at least one plastic layer having a first side and a second side opposite the first side and at least a first peripheral edge, the first side having a first textured surface, wherein between 7 to 20 percent of slope angles on the first textured surface proximate a first axis have a value between zero and five degrees, the first axis being substantially parallel to the first peripheral edge, wherein the plastic layer collimates light propagating therethrough.

[c107] 107.The back lighted device of claim 106, wherein between 7 to 20 percent of slope angles on the first tex-

tured surface proximate a second axis have a value between zero and five degrees, the second axis being substantially perpendicular to the first axis.

[c108] 108.The back lighted device of claim 106, further comprising at least one light directing film disposed proximate the first textured surface.

[c109] 109.The back lighted device of claim 106, wherein between 7 to 20 percent of slope angles on the first textured surface have a value between zero and five degrees.

[c110] 110.The back lighted device of claim 106, wherein the plastic layer has a UV absorber compound in a range of 0.01–1.0 percent of a total mass of the plastic layer.

[c111] 111.The back lighted device of claim 106, wherein greater than or equal to 80 percent of a total mass of the plastic layer comprises a polycarbonate compound.

[c112] 112.The back lighted device of claim 106, wherein the plastic layer contains an optical brightener in a range of 0.001–1.0 percent of a total mass of the layer.

[c113] 113. The back lighted device of claim 106, wherein the plastic layer contains an antistatic compound therein.

[c114] 114.The back lighted device of claim 113, wherein the

antistatic compound comprises a fluorinated phosphonium sulfonate.

[c115] 115. A light collimating and diffusing film comprising: a unitary layer wherein greater than or equal to 80 percent of a total mass of the unitary layer comprises a polycarbonate compound, the unitary layer having a first side and a second side opposite the first side and at least a first peripheral edge, the first side having a first textured surface, wherein between 7 to 20 percent of slope angles on the first textured surface proximate a first axis have a value between zero and five degrees, the first axis being substantially parallel to the first peripheral edge, wherein the plastic layer collimates light propagating therethrough.

[c116] 116. The light collimating and diffusing film of claim 115, wherein between 7 to 20 percent of slope angles on the first textured surface proximate the second axis having a value between zero and five degrees.

[c117] 117. The light collimating and diffusing film of claim 115, wherein between 7 to 20 percent of slope angles on the first textured surface are between zero and five degrees.

[c118] 118. The light collimating and diffusing film of claim 115, wherein the unitary layer further comprises an antistatic

compound disposed substantially uniformly within the unitary layer.

[c119] 119.The light collimating and diffusing film of claim 115, wherein said antistatic compound comprises fluorinated phosphonium sulfonate.

[c120] 120.The light collimating and diffusing film of claim 115, wherein the unitary layer has a UV absorber compound in a range of 0.01–1.0 percent of a total mass of the unitary layer.

[c121] 121.The light collimating and diffusing film of claim 115, wherein the unitary layer contains an optical brightener in a range of 0.001–1.0 percent of a total mass of the layer.